THE NORTHWEST TERRITORIES' SYSTEM OF RAPTOR DATA COLLECTION AND STORAGE

Northwest Territories Resources, Wildlife & Economic Development

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ABSTRACT

This report summarizes the means by which the Department of Resources, Wildlife and Economic Development has been collecting and storing data on birds of prey over the period 1982 - 1997.

Many raptor species utilize the same nests year after year. Predictable use of known sites (philopatry) allows raptor populations to be reliably censused.

Nests are described on a Nest Description Form the first time they are seen to be occupied. Nest description data are recorded in the database DESCALL. Nest site locations are also recorded on 1:250,000 scale file maps. Subsequently, each time the nest is visited, a Nest Visit Form is completed. Nest visit data are recorded in the database VISTOT. Banding information is recorded in the database BANDDATA. The structure of each of these databases is described in detail.

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INTRODUCTION

The Department of Resources, Wildlife, and Economic Development (previously the Department of Renewable Resources) has been systematically studying raptors since 1982 and has gathered considerable information on nest site location, nest productivity, and banding.

It is the intent of this report to describe the data collection and storage protocols so that the integrity of the databases can be maintained and so the data can be effectively accessed and supplemented.

DATA COLLECTION

Raptor Biology

A basic comprehension of raptor biology is needed to understand why and how data are collected and the means by which they are stored.

Many raptor species exhibit "nest philopatry"; i.e., individuals use the same nest site year after year. It is the predictiveness provided by nest philopatry which allows biologists to effectively census raptors. Following is a summary of general patterns of nest usage in arctic raptors:

Gyrfalcons-- Like all falcons, Gyrfalcons do not build nests. Typically, Gyrfalcons use old Common Raven or Golden Eagle stick nests. Usually, these nests are under overhangs and are marked with considerable "whitewash". Over the years, the stick nests become depleted and can end up as nothing but bare, whitewashed ledges. Gyrfalcon nests are usually distinctive and noticeable. Pairs will sometimes use alternative nests between years located in the same general location.

Peregrine Falcons-- In the Arctic, most Peregrine nests are simply dirt "scrapes" on small grassy ledges. Occasionally, Peregrines will nest in old Rough-legged Hawk stick nests. There is generally no whitewash around the nest and rarely an overhang. It is usually very difficult to find a peregrine nest unless the birds themselves indicate the location. Peregrines will nest on a variety of ledges along the same cliff so that the exact nest location varies from year to year.

Golden Eagles-- This species builds huge stick nests by adding to the existing nest year after year. Golden Eagle nests are typically quite distinctive because of their size. They are never marked with whitewash. Only very rarely will another raptor species nest near an occupied Golden Eagle nest.

Bald Eagles-- Bald Eagles nest on cliffs or in trees. Cliff nests are very similar to those of Golden Eagles. Tree nests are added to over the years until their bulk and the eventual death of the tree brings everything crashing down. Cliff nests can be continuously occupied for centuries

but tree nests last for decades, at best.

Common Ravens-- This species is not a raptor but acts like one in its nesting habits. Ravens build stick nests usually under overhangs. These are the preferred nests to be taken over by Gyrfalcons. Raven nests are strongly marked with whitewash.

Rough-legged Hawks-- This species differs from other Arctic raptors in not exhibiting a high degree of nest philopatry. Rough-legged Hawks eat small mammals which are strongly cyclic in numbers. Therefore, Rough-legs shift their nesting activity to areas where small mammal numbers are high or they remain in their usual nesting area but fail to nest. Rough-legs typically build a new nest each year.

Collection Protocol

Nesting sites are recorded only for species exhibiting nest philopatry. This excludes Rough-legged Hawks. Virtually all nest locations in the database are for Gyrfalcons, Peregrine Falcons, Golden Eagles, Bald Eagles, and Common Ravens.

Nest locations are recorded for the first time only when the nest has been seen to be used. In earlier years, "potential nest locations" were recorded as those thought to have the potential to be nest sites. This cluttered the database with many phantom nest sites which have never been seen to be used.

Because nests can be used by several species, they cannot be characterized as being a Gyrfalcon or a Golden Eagle nest except for a particular year. A nest might be built and used for several years by Common Ravens and subsequently be taken over by Gyrfalcons or even be used interchangeably between species.

Most systematic surveys have been done by helicopter. The typical procedure is for the principal researcher to sit in the front seat of the helicopter reading the maps and directing the pilot to known nest locations. The data recorder sits in the back seat and records the information provided from the front seat onto the data sheets held in a loose-leaf binder. The principal researcher typically keeps a rough tally of the information in a field book to provide a cross reference and backup. The route flown is sketched on the field map.

DATA STORAGE

The data storage system is composed of six separate components:

- hardcopy data sheets of nest descriptions,
- hardcopy data sheets for each nest visit,
- a nest description database,

- a nest visit database,
- nest location maps, and
- a banding database.

Nest Description and Nest Visit Data Sheets

Data are collected on two standardized data forms. The first is called the "Nest Description Form" (Appendix I) and provides information on the location of the nest, and who discovered it. The Nest Description Form is filled in once when the nest is discovered. The second form is called the "Nest Visit Form" and provides information on nest occupancy for each visit made to the nest. A Nest Visit Form is completed every time the nest is visited regardless of whether the nest is found or occupied.

The digital databases mirror the information on the data sheets. A detailed description of each field type is described below.

Data sheets are stored in a large file cabinet. Primary filing is by 1:250,000 map number with secondary ordering by site number. The hard copy data sheets provide a secure backup to the digital databases and, in some cases, contain supplemental information not readily stored in the databases.

Nest Description and Nest Visit Databases

Two databases correspond to the two types of data sheets. The file DESCALL contains the nest description information while the file VISTOT contains the nest visit information. These databases are related through the common site number field (SITENUM). A third database (BANDDATA) records the fate of all bands provided by the Bird Banding Office to the GNWT.

All data are entered in caps and dates are provided as ISI year.month.day format.

The original format used the Apple DBMaster database. The data were transferred to IBM format in 1986. Most work has used DBASE III although DBASE IV was tried unsuccessfully. Recent work has been in Paradox.

Following are field names and descriptions for the nest description database (DESCALL):

> SITENUM-- Site Number. A unique identifier given to each nest site. This is the relational key field used to link description and visit databases. Site numbers currently range from one to 2701.
>
> The convention in recent years has been to make the second digit of the site number correspond to the last digit of the year. So, all nest sites entered into the database in 1996 were given numbers in the range of 2600-2699.

COMMUNITY-- A three digit code identifying the nearest community. Appendix III is a listing of the codes.

Sometimes it is not apparent which community is closest to a nest site. Therefore, using the COMMUNITY field for searching must be done very carefully.

MAP-- An alphanumeric field indicating the name of the 1:250,000 scale National Topographic Service (NTS) map sheet. No dashes should be used.

LATDEG-- a two digit field indicating the degrees of latitude.

LATMIN-- indicates the minutes of latitude accurate to two decimal places. Seconds of latitude are not used. When latitudes are determined from 1:250,000 maps, accuracy can be determined only to the whole minute. Decimal minutes are appropriate when locations are taken from a GPS or determined from 1:50,000 maps.

LONGDEG-- a three digit field indicating degrees of longitude.

LONGMIN-- indicates the minutes of longitude accurate to two decimal places. Seconds of longitude are not used. When longitudes are determined from 1:250,000 maps, accuracy can be determined only to the whole minute. Decimal minutes are appropriate when locations are taken from a GPS or determined from 1:50,000 maps.

UTM-- this field refers to the Military Grid References described on NTS 1:250,000 maps. These designations are accurate to approximately 1 km and are appropriate for nest locations determined from 1:250,000 scale maps. This UTM format has been abandoned for the more flexible standard UTM designation below.

UTMZONE-- refers to the UTM Zone Designator.

UTMEAST-- a six-digit number referring to UTM easting. Accurate to 100 m when taken from 1:50,000 maps but only to 1 km when taken from 1:250,000 maps.

UTMNORTH-- a seven-digit number referring to UTM northing. Accurate to 100 m when taken from 1:50,000 maps but only to 1 km when taken from 1:250,000 maps.

NESTTYPE-- a code indicating nest type, when it can be determined. Codes are indicated on the Nest Description Form (Appendix I).

CLIFFHT-- the approximate height (in m) of the cliff or tree on which the nest sits. This is usually a very rough approximation.

NESTHT-- the approximate height (in m) of the nest above the ground.

OVERHANG-- approximate percentage of the nest which is covered by a rock overhang.

ASPECT-- direction in which the nest cliff is pointing.

ALTERNATE-- another nest which is known or suspected as being alternatively used by a single nesting pair in different years.

INITOBSR-- the first persons reporting the nest.

ADDRESS-- the affiliation or street address of the initial observers.

INITDATE-- the date at which the nest was discovered.

COMMENTS-- any supplementary information on the nest location.

MACKENZIE-- an X indicates that this nest is part of the Mackenzie Valley Survey. The approach is used because the SE-NW trend of the Mackenzie Valley makes it difficult to indicate Mackenzie Valley sites through use of latitude/longitudes.

Following are field names and descriptors for the nest visit database (VISTOT).

SITENUM-- the unique identifier given to each individual nest. This field is common to DESCALL and VISTOT and links them.

VISITDAT-- the date at which the nest was visited.

MAP-- as in DESCALL, this represents the NTS 1:250,000 map sheet.

TYPE-- this field indicates the mode of the visit; i.e., on the ground, by helicopter, and whether the nest was entered. More than one of the following codes may be used.

H = helicopter
G = ground
B = boat
E = nest entered, usually to band nestlings/
F=fixed wing aircraft

SPECIES-- A three-letter code for the species found at the nest. Species is not entered if STATUS codes are NS or UU (see below).

GYR = Gyrfalcon
PER = Peregrine Falcon
GEA = Golden Eagle
BEA = Bald Eagle
RAV = Common Raven
RLH = Rough-legged hawk
OSP = Osprey
MER = Merlin
SPP = other or unknown species.

STATUS-- A two-letter code indicating whether the nest is occupied or not, whether the adults have eggs or young, etc.

NS= Nest not seen; no birds seen.
OT= Occupied territory but no nest seen. One or more adults present.
UU = Unoccupied and unproductive. Nest seen but was not successful. No adults present.
OU= Occupied nest but known to have been unproductive.
OP= Occupied nest but productivity likely but uncertain; e.g., when birds have apparently fledged already.
OC= Occupied nest during courtship with no eggs yet.

OE= Occupied with eggs. Incubating female adequate evidence.
OY= Occupied with young. If both eggs and young, code OY.

ADULTS-- Number of adult birds seen.

EGGTOT-- Number of eggs. The number 9 is used if the number is not known. This should be borne in mind when doing such summaries as mean clutch size.

BADEGG-- number of apparently addled eggs. Usually determined as addled by timing; i.e., an egg remaining long after the young have hatched.

YGTOT-- number of young birds in the nest. The number 9 is used if the number is not known. This should be borne in mind when doing such summaries as mean brood size.

DEADYG-- number of dead young in the nest.

AGEYG-- age of young as estimated from visual inspection or by entering the nest and measuring and closely examining the young birds. This is a character field and can be entered in any units desired together with any qualifiers needed.

OBSERVERS-- names of persons making the nest visit.

ADDRESS-- affliliation or street address of persons making the nest visit.

NOTES-- any additional information.

Currently, DESCALL contains 1734 nest location records and VISTOT contains 9859 nest visit records.

The visit and description data sheets contain signature blocks to indicate who entered the data and when. For new nest descriptions, a signature block is also provided to signify entry onto file maps.

A common problem in the past has been assigning the same site number to two nests. This entails renumbering one of the sites and making changes in a wide array of data formats including field notes, visit data sheets, description data sheets, visit database, description database, file maps, photographic records, banding database, and any samples collected such as prey or feather samples. Signature blocks are provided on the description data sheet to ensure that each of these steps is carried out.

The band data database keeps track of United States Fish and Wildlife Service (USFWS) bands on hand, birds banded, and band recoveries. Data sheets were used in earlier years but have been abandoned. Data are now simply recorded in field notebooks.

Banding Database

The structure of the BANDDATA database is as follows:

BAND-- the USFWS band number. Dashes are not used to separate the prefix number.

USED-- A "U" (used) is recorded if the band has been placed on a bird. An "A" (available) is recorded if the band on hand. An "L" (lost) is recorded if the band has been lost.

SITENUM-- For nestling birds, the site number of the nest is recorded.

DATE-- Date at which the band was used.

COMMUNITY-- The nearest community to the banding location or, in the case of available bands, the location where the bands are being held (Appendix III).

MAP-- the 1:250,000 NTS map of the banding location.

SPECIES-- The species banded. The same three letter code is used for the nest visit data sheet .

SEX-- Sex of the banded bird, if known.

BROODSIZE-- Number of nestlings in the brood, if applicable.

WEIGHT-- Weight of the bird; in grams.

PRIMARY7-- Length of the seventh primary feather, in mm.

WINGCHORD-- length of the wing chord; in mm.

TAIL-- Length of the tail, in mm.

TARSUS-- length of the tarsus; in mm. Not recorded in recent years because of extreme variability in measurements.

BILL-- Length of the bill; in mm. Not measured in recent years.

OTHERSAMPL-- Other data samples taken such as blood.

PHOTODATA-- frame numbers for photo record used in aging.

ALPHABAND-- alphanumeric band data, if applicable.

NOTES-- comments dealing with health of the birds, weather, problems encountered, etc.

AGEFEATHER-- age of nestling as determined from feather measurements.

AGEPHOTO-- age of nestling as determined by comparing with known-age photos.

BANDERS-- persons doing the banding.

LAT-- a three digit code indicating the latitude to the lowest 10 minute block (i.e., no rounding). For example, a banding location of 62°28' would be recorded as 622, not 623. These data are required for reporting to the Canadian Wildlife Service Bird Banding Office.

LONG-a four digit code indicating the longitude to the lowest 10 minute block (i.e, no rounding). For example, a banding location of 115°19' would be recorded as 1151, not 1152. These data are required for reporting to the Canadian Wildlife Service Bird Banding Office.

DISTCOM-- Distance in miles to the nearest community or the two letter code used to report the banding location to the Bird Banding Office.
RECOVERY-- data on where and when the band was recovered.

The BANDDATA database now has 2577 records representing individual bands provided to the Government of the NWT by the Bird Banding Office.

Maps

Nest locations are mapped onto 1:250,000 "raptor file maps". These file maps should never leave the central repository. They should be copied if maps are required for field use. In the Coppermine, Hope Bay, and Mackenzie Valley study areas, 1:50,000 file maps are also prepared. Typically, the site number is recorded with a colour indicating the species most likely to be found (black = raven, blue = peregrine, red = gyrfalcon, green = golden eagle). If several species have used the nest, letters are printed beside the site number to indicate species use.

READ/WRITE AUTHORIZATIONS AND SECURITY CONCERNS

Only one person in the Department should have full read/write access to the databases and should be responsible for the continuing integrity and security of the database. This person may delegate update capabilities on a project-specific basis.

Raptors can command significant amounts of money on the black market. It is possible that an unscrupulous person could utilize the raptor location database or the file maps to determine exactly where to go to illegally remove young birds from the nest. Consequently, it is important to retain a certain amount of security over the data to ensure that it does not fall into the wrong hands. Data on nest site location should only be provided to persons with a legitimate interest and should be accompanied with information on the importance of maintaining nest locations in confidence.

APPENDIX I.

RAPTOR NEST DESCRIPTION FORM

(DO NOT ENTER INTO COMPUTER UNTIL ALL DATA ARE RECORDED HERE)

SITE NUMBER _____ COMMUNITY CODE_____ MAP NUMBER_____

DATE OBSERVED_____ LAT_____ LONG_____ UTM_____
yr/mo/day

ASPECT___ %OVERHANG____ CLIFF HT__ m NEST HT___ m NEST TYPE____
(Nest type codes; RS = raven nest, GS = golden eagle nest, HS = hawk stick nest, US = unknown stick nest, GL = grassy ledge, RL = rocky ledge, TN = tree nest, GN = ground nest)

ACCESS _____ ALTERNATIVE SITES_____

INITIAL OBSERVERS_____ ADDRESS _____

NOTES:

Computer Entry: Operator _____ Date _____

File Map Entry: Recorder _____ Date _____

If site number is changed, make changes in following and check them off: ___ Notes, ___ DESCALL, ___VISTOT, ___ File Maps,___
Hardcopy Description, ___ Hardcopy Visit, ___ Photos,
___ Banding Forms, ___ Samples.

APPENDIX II: RAPTOR NEST VISIT FORM

GOVERNMENT OF THE NWT
DEPARTMENT OF RENEWABLE RESOURCES

RAPTOR NEST VISIT FORM

(DO NOT ENTER INTO COMPUTER UNTIL ALL DATA ARE RECORDED HERE)

SITE NUMBER _____ COMMUNITY CODE _____ MAP NUMBER _____

DATE OBSERVED _____ SPECIES ___ STATUS __ TYPE OBS _
(yr.mo.d)

 # ADULTS _ # EGGS __ # ADDLED EGGS __ # YOUNG __ # DEAD _

AGE OF YOUNG _____ METHOD OF AGING _____

BAND NUMBERS _____

OBSERVERS _____ ADDRESS _____

NOTES AND COMMENTS

Computer entry: Operator _____ Date _____

STATUS CODES

NS	Nest not seen; no birds seen.
OT	Occupied territory but no nest seen. One or more adults present.
UU	Unoccupied and unproductive. Nest seen but was not successful. No adults present.
OU	Occupied nest but known to have been unproductive.
OP	Occupied nest but productivity likely but uncertain; e.g. when birds have apparently fledged already.
OC	Occupied nest during courtship with no eggs yet.
OE	Occupied with eggs. Incubating female adequate evidence.
OY	Occupied with young. If both eggs and young, code OY.

CONVENTIONS FOR ENTERING NUMBER OF ADULTS, EGGS, AND YOUNG

Leave fields blank for status codes NS, OP, OT. Enter relevant numbers for status codes UU, OC, OU, OE, OY. When number not known, enter 9.

OBSERVATION TYPE CODE

H = helicopter, G = ground, B = boat, E = nest entered, F = fixed wing. Can use two types together.

SPECIES CODE

GYR = gyrfalcon, PER = peregrine, GEA = golden eagle, BEA = bald eagle, RAV = raven, RLH = rough-leg, OSP = osprey, MER = merlin, SPP = other species.

COMMUNITY CODES

AKL	Aklavik
ARB	Arctic Bay
ARR	Arctic Red River
ARV	Arviat
BKL	Baker Lake
BRI	Broughton Island
CAM	Cambridge Bay
CDT	Cape Dorset
COR	Coral Harbour
DEL	Deline
FGH	Fort Good Hope
FLI	Fort Liard
FMP	Fort McPherson
FPR	Fort Providence
FSI	Fort Simpson
FSM	Fort Smith
FTR	Fort Ross
HOL	Holman
INU	Inuvik
IQL	Iqaluit
LHR	Lake Harbour
LKE	Lutsel K'e
NBU	Nahanni Butte
NWE	Norman Wells
PAU	Paulatuk
PNG	Pangnirtung
PON	Pond Inlet
PYB	Pelly Bay
RES	Resolute
RNI	Rankin Inlet
RPB	Repulse Bay
SAH	Sachs Harbour
SKQ	Sanikiluaq
TOL	Toloyoak
TSI	Tsiigehtchic
TUL	Tulita
YKN	Yellowknife